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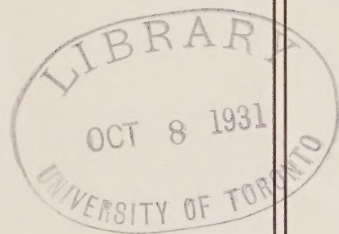
FIELD BEANS IN CANADA

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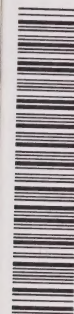
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FIELD BEANS IN CANADA

Field beans comprise many types, of which the bush or dwarf varieties are grown mostly for the production of the ripened seed for human food, although the injured or inferior samples are frequently used for feeding to farm animals.

Beans are an important crop from many vital considerations. They approach animal foods in nutritive value, containing a higher percentage of protein than wheat or oats or even meat. Their leguminous characteristics by which the growing plant is capable of taking up indirectly the free nitrogen of the air and storing it in tubercles on the roots make beans a valuable crop in rotation systems. Where they can be grown at an efficient and low cost per bushel they are a high-yielding cash crop requiring attention when other crops do not demand it most strongly.

Production in Canada

The kidney bean is supposed to be a native of North America and has been grown in Canada for many years, being confined largely to Southern Ontario. The average production in Canada for the years 1925-30, according to agricultural statistics from the Dominion Bureau of Statistics, was 1,312,870 bushels. The average yield per acre amounted to 16.9 bushels per annum. During the period 1925-30 seven provinces in Canada were producing large quantities of field beans. Ontario produced an average of 934,880 bushels annually; Quebec, 275,660 bushels; Nova Scotia, 35,250 bushels; New Brunswick, 35,150 bushels; British Columbia, 16,500 bushels; Saskatchewan, 11,330 bushels; and Alberta, 4,200 bushels. Ontario produced the bulk of the commercial crop, particularly Southern Ontario. It is interesting to note that the counties of Kent, Elgin, and Huron in Southern Ontario produced an average of 775,098 bushels or 60.9 per cent of the average annual production in Canada during the years 1925-29.

Field beans marketed as dry beans are used almost entirely for human food. Cull beans are valuable as concentrates in live-stock feeding. The approximate annual consumption in Canada has reached 1,500,000 bushels in recent years. To meet this demand Canadian consumers import from 100,000 to 300,000 bushels annually. Japan, Belgium, and the United States are the principal countries sending beans to Canada.

Adaptation

In general, beans require about the same climatic and soil conditions as corn. Beans are easily killed by frost. Because of this they can be grown successfully only in those sections that have a season long enough to permit planting after the last killing frost of spring and harvesting before the first killing autumn frost. The varieties grown as field beans at Ottawa commonly mature in between 92 and 110 days.

Field beans are grown successfully on a great variety of soils providing there is good drainage. They thrive best on warm porous soils that are at the same time fertile, retentive of moisture and yet well-drained. If a choice of land can be made select rich sandy loams. Though not thriving as well on either clayey or gravelly soils, field beans can be grown successfully on them if care is taken to put these soils in proper condition.

Rotation

In the rotation, beans should follow clover hay, pasture or meadow. Sweet clover ploughed down from the previous season's seeding is frequently used. They are used as a hoed crop and assist in the preparation of the soil for grain crops. They may also prove a profitable crop to grow as a summer-fallow substitute under dry land conditions.

Fertilizers

On light, sandy soils and on those low in organic matter the application of six or eight loads of well-rotted manure is good practice. On soils well supplied with organic matter manure may tend to produce vines rather than bean-bearing pods. The application may be made in the fall or after the land is ploughed in the spring, and whether ploughed or disked in, it should be thoroughly incorporated with the soil. Commercial fertilizers may be expected to increase the yield and improve the quality. On sands or sandy loam nitrogen and potash may be included with phosphate to make a complete fertilizer. On heavier soils, particularly where clover has been ploughed down or manure applied, acid phosphate is the proper fertilizer. The analysis and rate of application should be dependent upon the type of soil, natural fertility, and previous cropping and treatment.

The bean at the germinating stage is one of the tenderest of plants. To avoid injury from contact the fertilizer should not be applied in direct contact with the seed.

Preparation of the Soil

Ploughing, like manuring, is best done early, preferably in the fall, turning a well set up, moderately deep furrow. Good results may be obtained in the spring if the ploughing is done at least a month before planting time. In either case the manure should be ploughed in or worked in on the surface with the disk harrow. The land should receive frequent cultivation to bring it to the best possible condition of tilth, to conserve moisture and destroy weeds and weed seeds. A suitable seed-bed is fine and mellow at the surface but fairly firm underneath.

Planting

Beans should be planted as soon as the soil warms up and the colder weather is past. Probably the last week in May would be suitable, but this would depend on the quality of the soil, place in the rotation, variety of beans to be used, and the season. Wet, cool weather may delay germination so that the beans begin to decay, producing poor stands. The important thing is for the beans to make rapid continuous growth when they start.

The rate of planting varies with the size of bean. About 45 pounds of seed per acre would be considered ample for pea beans. The marrowfat types under similar conditions would require 60 pounds or probably more per acre.

The ordinary grain seeder having 7-inch spaces between the tubes is one of the best machines for planting beans. By stopping up certain tubes this will plant rows 28 inches apart, which is about the proper distance. Special bean planters are available. The depth of planting will depend upon the kind of soil and its condition with regard to heat and moisture. A quick even germination is required, and to secure this it is essential that the seed be planted just deep enough to cover well in a fine moist soil.

Seed

Care should be exercised in the selection of beans for seed. It is important to use well developed, well matured, uniform, sound seed of strong vitality. Pureness of variety above all is essential. Diseased seed will usually produce

diseased plants, and infection may be spread throughout the crop. Hence it is advisable to select plants from the field just before harvest. In this way uniform ripening, high-yielding plants can be secured and at the same time plants showing symptoms of anthracnose, mosaic, blight, or other diseases may be discarded.

The seed should be graded and carefully tested for germination before it is sown. This test can be made at home by planting a uniform sample of seed in a pot of moistened soil placed in a bright warm position.

Cultivation

Much of the cultivation work on the bean field should be done before the seed is planted by producing a clean seed-bed. A light harrow may be run over the land before the plants appear. If this has not been done and the beans come up quickly cultivation should begin at once. The ordinary corn cultivator may be rearranged for bean work. Cultivation should not be too deep, but the soil should be kept stirred on the surface. Most growers do not cultivate while the leaves are wet with dew or rain for fear of causing the spread of diseases. Cultivation should be kept well in hand early in the season so that little work need be done after the blossoming period has started.

Harvesting

Where small fields or garden lots are grown the beans are almost invariably harvested by hand. For large crops of beans a bean harvester may be used. A special attachment swung under the axle of the ordinary field or corn cultivator will readily convert it into a bean harvester. Two rows are pulled at once and the beans are placed into one windrow. They may be forked out of these rows and placed in small bunches or some people use a side-delivery rake and bring them into larger windrows. A hay loader may be used for loading them on to the wagon. It is important to keep the beans clean, and if possible they should be stored without getting much rain. The wetting of beans may not injure them materially provided they are not allowed to be on the ground without being turned over. They should be stored in sheds or barns as soon as cured.

Threshing

The threshing of beans is accomplished in one of two general ways. They may either be flailed out on threshing floors or threshed in some sort of separator. Machine threshing is best done with a machine specially constructed for the purpose, and having two cylinders which run at different velocities. These machines are built in six sizes, the smaller handling 10 bushels per hour and the larger size handling 150 bushels per hour. As soon as a quantity of beans are regularly grown in a locality it may pay the growers to co-operate to purchase this machine. The grain separator, however, may be arranged for threshing beans by removing a number of the concave and cylinder teeth and reducing the speed of the cylinder. These precautions are necessary as beans broken or split cannot be sold either for commercial or seed purposes.

Marketing

The usual practice is to market beans in the condition in which they came from the thresher, leaving the cleaning, grading, and picking to the elevator men. Here they are first put over a grader and then over mechanical pickers and, if they are not marketable, they may be hand picked. Market grades are based on certain requirements as to the percentage of splits, damage, other beans and foreign material. Well-screened samples of good natural colour are desired with a moisture content not over 18 per cent. Commercial grades for Canada are under consideration.

Varieties

A number of varieties have been tested at the Central Experimental Farm. Information regarding these varieties over the five-year period 1926-30 is given in table I. Beans are frequently classed into three groups: small white, medium or large white, and coloured. Varieties classified as small generally average less than 250 grammes per thousand and are frequently called pea beans. This group includes such varieties as White Pea, Early White, Burbank, Michigan Robust, Robust, Pilot, and Lady Washington.

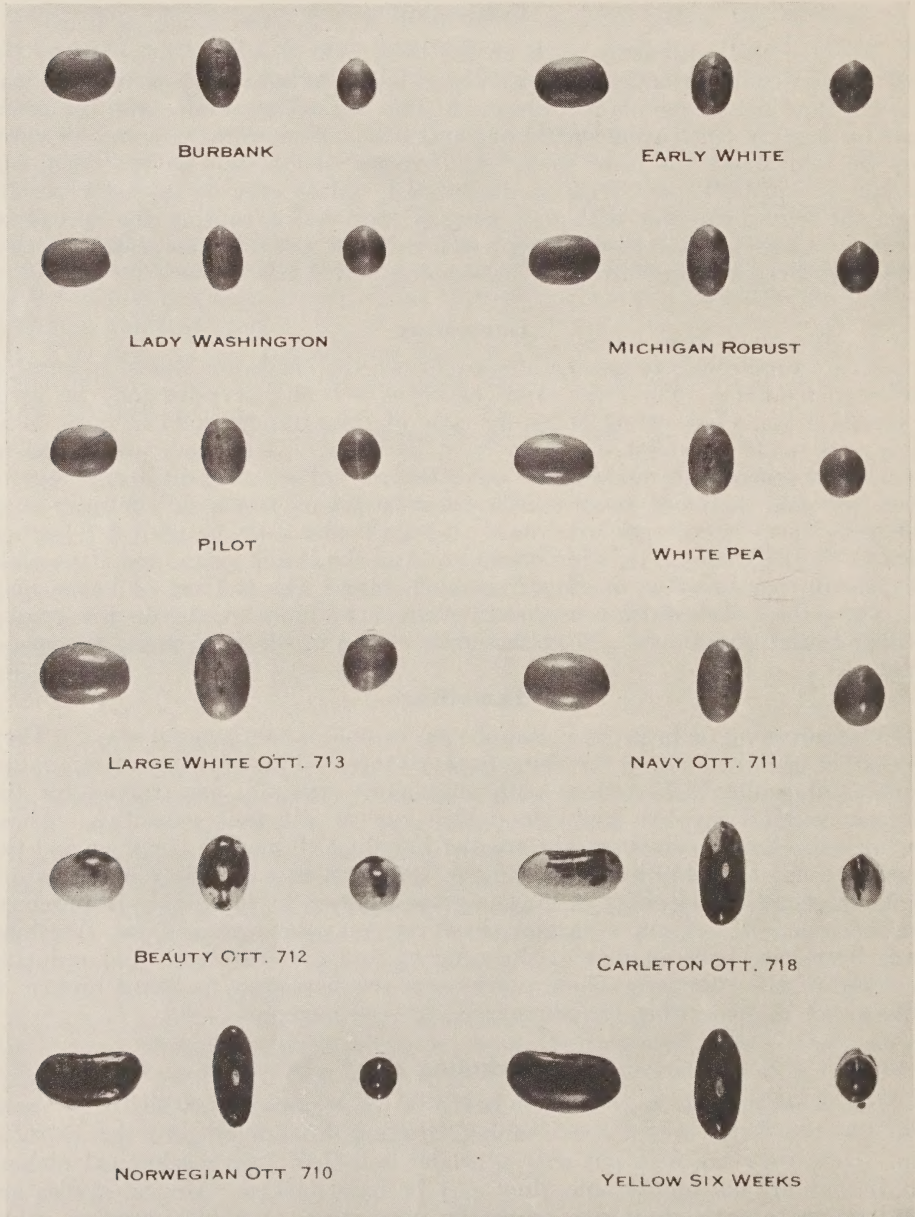


Fig. 1.—Seeds, natural size, of the varieties of field beans tested.

(Photo by P. R. Cowan)

TABLE I.—AVERAGE RESULTS FOR THE YEARS 1926-1930 AT THE CENTRAL EXPERIMENTAL FARM

Name of variety	Number of days maturing	Length of vine	Length of pod*	Weight per bush.	Weight per 1,000 kernels	Yield per acre
		in.	in.	lb.	gram.	bush.
Burbank.....	102.8	27.5	3.4	64.3	222.1	33.8
Early White.....	105.2	22.7	3.5	64.6	219.1	34.0
Lady Washington.....	109.5	31.1	3.4	65.3	214.0	33.0
Michigan Robust.....	111.3	20.8	3.5	63.9	200.7	38.3
Pilot.....	107.8	27.2	3.1	64.9	215.6	36.2
White Pea.....	106.7	21.7	3.5	64.6	226.0	35.5
Large White Ott. 713.....	94.9	13.6	4.0	60.4	430.9	23.4
Navy Ott. 711.....	101.5	26.3	3.9	63.1	328.2	35.6
Beauty Ott. 712.....	94.3	11.1	3.8	64.4	297.5	17.7
Carleton Ott. 718.....	92.7	11.3	3.9	60.6	326.3	16.5
Norwegian Ott. 711.....	95.7	12.1	4.9	61.1	372.1	34.1
Yellow Six Weeks.....	97.6	13.1	4.9	62.2	443.0	27.5

*Average of 4 years 1927-1930.

The *White Pea* variety is one of the most generally grown of the varieties in this group. The yield has been very good, though a small amount of anthracnose disease and mosaic is usually present. *Early White*, a similar variety, has not yielded quite so well at Ottawa.

The variety grown under the name of *Burbank* is said to have been originated by Luther Burbank. The general characteristics of this variety are similar to the *White Pea*, but it is on the average the earliest maturing in this group. This variety has yielded well at Ottawa and in Southern Alberta.

Michigan Robust is a pure line selection from *White Navy* by the late Professor Spragg at the Michigan Experiment Station in 1907. Among the principal points in its favour are immunity to mosaic and a high resistance to the anthracnose disease. *Michigan Robust* has been one of the latest maturing varieties under test at Ottawa, and though it has been a consistently good yielder it is frequently touched by early autumn frosts.

Lady Washington is an old variety introduced in 1924 the seed originally coming from growers in California. It is quite susceptible to disease and is not a suitable canning bean because of its rapid disintegration on cooking.

Navy Ottawa 711 is a pure line selection from the commercial *Navy* bean, from which it does not differ greatly. The plants are rather long and medium early maturing. It is not particularly disease resistant, but a very productive variety. The beans are white and of medium size.

Large White Ottawa 713 is a pure line selection from a natural cross. The plants are rather short and somewhat early in ripening. The beans are softer and break up unusually rapidly when cooked.

Among the coloured types *Norwegian Ottawa 710* is particularly noteworthy. It is a pure line selection from a variety received from Norway many years ago. The plants are quite short, bearing rather long pods ripening very early. The seed is yellowish-brown, of medium size and elongated form. These retain their shape when cooked and do not readily break up, though they become soft. This variety was developed for districts where the growing season is very short but where a good yielding variety might be desired for home use.

Beauty Ottawa 712 is a pure line selection from a natural cross found at Ottawa. The seed is rather small, typically white with pale brownish and greenish markings at the eye (hilum), the colour varying somewhat from season to season. The plants are short and ripen very early.

Carleton Ottawa 718 is a cross between Improved Golden Wax and Challenge Black Wax made in 1907. The colour varies from white with brown markings to essentially brown with a few white markings. The plants are very

short and extremely early in ripening. Both Carleton and Beauty are generally quite susceptible to both anthracnose and mosaic in the field.

Yellow Six Weeks is a yellow bean of oblong shape, quite productive and almost as early as Norwegian.

Bean Growing in the Different Provinces

As a field crop in Nova Scotia beans are grown most extensively in the counties of Annapolis, Kings, Hants, and Lunenburg. Small areas are grown on many farms for home use. Yellow Eye and pea bean types are most generally grown. At the Experimental Station at Fredericton, N.B., several varieties have been tested. Seeding takes place on the average from May 27 to June 2 and maturity is reached in late September. The standing of the four leading varieties from the average of eight years' results, 1922-29, are Navy Ottawa 711, White Marrowfat, Soldier, and Yellow Eye. The anthracnose disease has caused serious damage in some seasons.

Varieties have been tested at the Experimental Stations at Cap Rouge, Ste. Anne de la Pocatière, and Lennoxville in Quebec. At the Cap Rouge Station, varieties mature on the average from 109 to 119 days. The heaviest yielder has been Norwegian among the coloured sorts and Navy among the whites. The Robust variety has outyielded Navy on a five-year average at the Experimental Station at Ste. Anne de la Pocatière, although it is usually about six days later maturing. Navy is considered a superior variety at the Lennoxville Experimental Station. This variety is of excellent quality and matures early enough to be seldom injured by frost in this district.

The small pea bean types are more popular from the standpoint of production throughout Western Ontario than the larger types. The common pea bean ripens on the average in 107 days in this section and yields about the same as the Navy and Robust varieties. The Burbank variety has also yielded well at the Central Experimental Farm and has been one of the earlier maturing varieties.

Field beans are not grown commercially in Manitoba. Tests have been conducted at the Experimental Stations at Morden and Brandon. The season at Brandon is seldom long enough to successfully mature Navy and later varieties. Norwegian has produced fair yields. Data from the Morden Station indicate that the average season in Southern Manitoba is well adapted to the production of early Navy and pea bean types.

Data over several years at the Experimental Station at Rosthern, Sask., show that Norwegian, Beauty, Burbank, and Large White may be grown under these conditions. Beauty has given the best returns, although Norwegian has yielded well also. Navy is rather late here and has been tried with very little success.

The length of the growing season over the greater part of Southern Alberta does not appear to be prohibitive for growing beans successfully under average seasonal conditions. The crop has been grown on dry and irrigated land at the Experimental Station at Lethbridge. Under dry-land conditions, there is much less danger from early frosts than under irrigated conditions as the crop ripens at least a week earlier. However, the yield may be much lower than where irrigation is used. Burbank has shown good yields under dry-land conditions. Trials in the northern part of the province have not been so successful. Though maturity has been obtained in some seasons with earlier varieties at Fort Vermilion, Alta., the tendency to late spring and early autumn frosts almost eliminates field beans as a possible cereal crop. The Agassiz Experimental Station in British Columbia has tested a few of the more common varieties. White Marrowfat, Norwegian, Navy, and Large White have given a good yield per acre maturing in about 105 to 110 days.